1301.0 - Year Book Australia, 2000
ARCHIVED ISSUE Released at 11:30 AM (CANBERRA TIME) 25/01/2000

A HUNDRED YEARS OF AGRICULTURE

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INTRODUCTION

Like most industries, Australian agriculture has experienced unforeseen gains in productivity and output, through the application of new technology and science over the last 100 years. At the turn of the century, much of the energy used to operate farms came from manual labour, assisted where possible with horse, bullock and steam power. Large scale farming and grazing relied upon the availability of large numbers of unskilled workers. Today, farms which employed hundreds of labourers at the turn of the century are operated by a few people with the help of sophisticated machinery and technology. Improvements in disease and weed control, through the use of advanced chemicals, have revolutionised the ways in which farmers prepare their ground and control diseases in crops and livestock. However, adoption of technology, such as extensive use of fertilisers and irrigation, tree clearing and chemical spraying, brings its own challenges to agriculture. Extensive land degradation through increased soil salinity (such as in the Western Australia grain belt and the Murray - Darling Basin), increased soil acidity, chemical residues in agricultural products, and consumer backlash to genetically modified products, are some of these challenges.

The start of our century

At the end of the last century Australia was emerging from the impact of two major depressions (in the 1880s and 1890s), and was in the grip of a severe drought. Despite this, Australian agriculture continued to develop and, while wool and wheat dominated the agricultural scene, primary production was already characterised by great diversity, with meat cattle, dairying, sugar cane and a wide range of horticultural crops grown.

The first two decades of the new century were characterised by a series of droughts, each having a marked impact on livestock numbers. The 'Great Drought' from 1895 to 1903 was thought at the time to be the most widespread drought in the history of Australia. While it affected the whole country, it was most persistent on the coast of Queensland and the inland areas of New South Wales, South Australia and central Australia. Sheep numbers, which had reached more than 100 million in the early 1890s, were reduced by half, and cattle numbers by more than 40%. In the nine years from 1895 the average wheat yield exceeded 8 bushels per acre (0.55 tonne per hectare) in only one year, and dropped to 2.4 bushels per acre (0.16 tonne per hectare) in 1903, when the great drought hit the eastern States.

A number of Australian inventions and technological advances helped expansion around the turn of the century. These included:

- the stump jump plough, which allowed ploughing of areas from which stumps and roots had not been fully cleared. This resulted in the opening of the mallee country in Victoria and South Australia;
- the combine harvester, which stripped, threshed and winnowed wheat, allowing farmers to harvest wheat crops on a large scale;
- the 'scrub' roller, which facilitated the clearing of large tracts of light bush country;
- the discovery and use of water held underground in the Great Artesian Basin, which opened up thousands of square miles of country in inland New South Wales, Queensland and South Australia, previously unavailable for pastoral activities; and
- the development of irrigation around Mildura by the American Chaffey brothers.

By the start of the 20th century the horse and bullock were replacing much of the hard manual labour, the horse generally used to draw farm machinery and the bullock to transport farming produce. Bullock teams pulled wagon loads of wheat and wool to railhead depots and river ports, where the goods were transported by train or paddle wheel steamboats to sea ports, from where the produce was exported. Steam traction engines had also entered the agricultural scene, where they were used in hay baling, grain threshing and chaff cutting. During the 1880s, steam powered shearing machines started to be widely used.

Expansion of the inland country rail network in the late 1880s meant that new areas could be farmed for grain production, resulting in an increase in crop area planted. As well as improvements in transport, improvements in genetics were having an influence on the wheat industry. In the late 1890s William Farrer created the rust resistant wheat variety 'Federation Wheat', which could be better harvested by a mechanical harvester than previous varieties. It was released in commercially viable quantities in 1901 and significantly lifted average yields in later years.

Although technological advances had reduced some of the farm workload, the era of tough manual labour had not altogether passed. In the heavily timbered lands (the Gippsland area of Victoria, the North Coast of New South Wales, the North West and North East of Tasmania for example) the immensely difficult task of clearing scrub still confronted the small farmer, known as the 'cockie'. This clearing was mainly done by ringbarking (cutting through the bark and sapwood around the trunk of the tree with an axe) to kill the big timber, and cutting down and burning the smaller trees.

Further inland, the rural scene was dominated by 'squatters', who had moved into interior New South Wales, Victoria, and other mainland colonies and held vast tracts of land, mainly used for sheep grazing. Wool was the basis of most pastoral wealth in Australia. **Commonwealth Year Book No. 1 (1901-1907)** commented about the sheep/wool industry:"...Fortunately for Australia, the suitability of its climatic and general conditions for the production of a high class of wool was, at an early date in the history of its settlement, surmised and tested by Captain Macarthur, one of the pioneer sheep breeders of New South Wales".

While the average price for wool in 1907 was 23% above the relatively depressed prices received in 1903, the 1907-08 season saw a reversal of price trends. Wool prices continued to be depressed until the outbreak of World War I, after which they improved (largely due to the demand for woollen service uniforms). Much of the 1916-17 wool clip was acquired by the Imperial Government at the flat rate of 15.5 pence per pound (greasy), equivalent to $8.40 per kilogram today. Control of the compulsory acquisition scheme, under the Central Wool Committee, continued until the end of the 1919-20 season. The influence of the War on wool

prices can be gauged by the fact that the average price paid for the 1917-18 clip was 40% higher than that paid in 1907, and 58% above the 1912 average price.

About 284,000 tonnes of beef and 400,000 tonnes of mutton and lamb were exported in the first decade of the century. While two-thirds of frozen mutton and lamb was exported to the United Kingdom, South Africa (Cape Colony and Natal) purchased over 50% of frozen beef exports in the early 1900s, the Philippines around 20%, and the United Kingdom about 15%. There were substantial falls in beef, mutton and lamb exports in the years after 1901, as the Great Drought impacted on stock numbers and then producers began herd rebuilding.

New South Wales and Victoria dominated the dairy industry. Dairy herds were generally very small by today's standards, about 20 milking cows, and most cows were hand milked. In 1901 there were about 1.2 million dairy cattle, producing 46,000 tonnes of butter and 5,000 tonnes of cheese, of which about a quarter of each product was exported.

In the 1901-02 season, wheat accounted for 2 million hectares of the area under crop, followed by oats (187,000 hectares), maize (119,000 hectares), and barley (30,000 hectares). The areas planted to orchards and fruits, sugar cane and potatoes amounted to 59,000 hectares, 54,000 hectares and 44,400 hectares respectively. Most cropping was done in the eastern States, but by 1904-05 Western Australia had started to emerge as an important grain grower. Other broadacre crops, such as grain sorghum, canola, field peas and safflower, had not yet made an appearance.

Attempts had been made to grow cotton and coffee, but without much success. **Commonwealth Year Book No. 1** commented: "...Hopes are entertained that with the invention of a mechanical device for picking of the cotton the industry will become firmly established, since the soil and conditions appear eminently suitable for the growth of this crop".

The clearing of extensive plots of land was also beginning to take a toll in some areas. The practice of crop and burn, which had proven successful in the Wimmera, was not suited to the Mallee; it led to soil exhaustion and poor crops, followed by more intensive cropping which, within a relatively short time, turned extensive areas of previously vegetated land into sand dune deserts. Rabbit numbers were also beginning to build up, and by the outbreak of World War I the rabbit had already had a significant impact on the carrying capacity of land in Victoria and New South Wales, spreading rapidly from Geelong.

Australia already had a significant vineyard and wine making industry, and irrigation in the Murray - Darling basin led to large increases in grape growing over the later decades. The main destinations for wine exports were New Zealand and the United Kingdom. In 1901, 23.9 million litres of wine were produced, of which 3.9 million litres were exported. Grapes were also grown for eating and drying, with around 23,000 tonnes of grapes produced annually for table consumption in the early years of the century. South Australia and Victoria were the main wine and grape producing States, followed closely by New South Wales.

Potatoes were, as now, the main vegetable crop grown, with 44,700 hectares sown at the turn of the century. Planting and harvesting were originally done by hand, and involved strenuous labour. Horses were used in ploughing and mounding the soil along the potato rows. Harvesting was done using a fork, and the potatoes were bagged for transport to market by horses or bullocks. At the end of our century machine planting and harvesting have replaced the horse and fork, and the bag has been replaced by bulk handling facilities. New varieties and irrigation have pushed yields up to 35-40 tonnes per hectare, compared with 5-8 tonnes per hectare at the beginning of the century.

Sugar cane growing made its appearance on the Australian agricultural scene in the early 1860s in Queensland, with 20 acres (8 hectares) of cane recorded in 1862. The following year a small

area was grown in New South Wales, and by the turn of the century sugar cane growing had become established as a significant agricultural activity. The industry used slave labour known as 'Kanakas', people uprooted from the Pacific islands and brought to Australia to work as cheap labour on the sugar farms. **Commonwealth Year Book No. 1** states, in relation to sugar bounties, "...The provision of bounties or similar aids to the sugar-growers of the Commonwealth early occupied the attention of the Commonwealth Parliament, the object in view being that of assisting the industry whilst at the same time diminishing the employment of coloured labour in connection therewith ...". An additional payment was provided on all sugar cane delivered that had been solely grown and harvested by white labour.

At the 1901 Population Census, almost 30% of the male population and just over 10% of the female population (23.4% of the total population) were employed directly in the agricultural and pastoral industries. At the census of 1911, 21.7% of the population were recorded as employed in these industries. These figures are not complete as the Aboriginal population was not enumerated in the Census. Large numbers of the Indigenous population worked as stockmen, stockwomen, and in other support roles on the big pastoral spreads, and made a significant contribution to Australian agriculture. Queensland's Chief Protector of Aborigines from 1914 to 1942, J.W. Beakley, stated: "The real pioneers were Aboriginal women, because without them, the white men could not have carried on", and that the pastoral industry, which was "perhaps the most important asset of this vast Commonwealth", would be in a sorry plight "...if deprived of its native labour in outback places where white labour is not only difficult to obtain but often inferior in quality".

The 1920s and 1930s

By the early part of the 20th century Australia's agricultural production had rapidly increased as a result of new and improved technology, including more productive grain varieties and advances in livestock breeding. Output expanded well beyond the needs of the Australian population, and Australia developed to become one of the world's major food exporters. Over subsequent years a succession of governments, in an effort to support this growth, have provided various assistance schemes to the primary production sector.

The first of these support schemes aimed to support and encourage burgeoning industries. The Bounties Acts and Amendments were designed to encourage the manufacturing of certain items. In 1907 bonuses were paid on the production of a number of agricultural products, such as cotton, fibres, rice, coffee, tobacco and dried fruits. Bonuses were extended across other agricultural industries, and in 1924 they included the production and export of canned apricots, peaches, pears and pineapples. These Acts worked by enabling a government-funded bounty to be paid to each manufacturer based on the quantity of produce manufactured.

Following the end of World War I, Australian agriculture expanded, helped by the removal of wartime restrictions and a return to pre-war shipping and export patterns. The Government continued with its objective of establishing more of the population on the land and breaking up some of the vast 'squatter' holdings. As an extension of governments' closer settlement policies pursued since the early 1900s, new areas of agriculture were established to provide returned soldiers with both a place to live and an occupation. Unfortunately insufficient use had been made of the expert technical and scientific knowledge already developed across Australia; as a result, some of the land acquired and broken into smaller allotments was not suitable for small scale farming. In addition many of the settlers, despite great effort, were unsuited to the arduous tasks involved. Establishing more people on the land did not necessarily mean greater agricultural production, and by 1927 the losses accumulated by 37,561 soldier settlers amounted to 23.5 million pounds.

A number of good seasons in the early 1920s resulted in a record high 14.4 million head of cattle.

This coincided with a low beef price in England, making it financially impossible to continue the export trade established by Australia. In 1922 the Government intervened and the Meat Export Bounties Act was passed. This established a bounty payment on any exported beef, and on live beef exported for slaughter, and had the desired effect of not only supporting the primary producer, but also halting the likely closure of a number of meat works across the country.

Another major industry receiving support at the time was the dairy industry. In 1926 a scheme was introduced to offset a low export price for butter, by establishing a high home price maintained by heavy duty on imports. A similar arrangement was established for sugar growers faced with low world prices at the end of World War I.

Prosperity within the wheat industry also fluctuated. In 1915-16 the area planted to wheat increased by 1.2 million hectares in response to a 'war effort' request by the Government, and reached a record high of 5 million hectares. Unfortunately this planting was followed by a year of low commodity prices, and subsequent plantings dropped to pre-war levels of around 2.6 million hectares. This forced the Government to provide a remuneration guarantee on wheat prices, which renewed confidence in the industry and resulted in an increase of 1.1 million hectares in the area planted to wheat in 1920-21. Of the 4.5 million hectares sown to the major crops in 1922, wheat accounted for about 88% by area.

To help in the development of new industries, bounties were applied to the export of some goods and import tariffs applied to others. Within the viticulture industry the use of phylloxera resistant root stock resulted in an increase in both the area planted to grapes and the production from vines. However wine production did not increase as rapidly, due largely to limited local consumption and the inability of the industry to find strong export markets for new wines. To improve this situation a Commonwealth bounty was provided in the 1920s on the export of wine of specified strength.

By this time rice had been grown successfully in the Murrumbidgee Irrigation Area. As the United States had established a number of new outlets in the East and the markets appeared lucrative, in 1924-25 the first attempt was made to grow rice commercially. The Government, keen to support growers, applied a custom duty on the import of rice.

Unlike the industries identified above, wool continued as a valuable commodity after the War, with most production exported and only 8% used by Australian mills. By the mid 1920s the United Kingdom, which had an established and expanding textile industry, was purchasing about 50% of total wool exports, up considerably on the pre-war figure of 30%. In 1924 wool exports accounted for 78% of all pastoral export income. By 1928-29 Australia had 103 million head of sheep and produced 440,000 tonnes of wool, accounting for 17% of the world's sheep population and 25% of the wool supply. This represented half of the world's merino wool production.

In 1930 the world wide Depression resulted in the closure of Australian factories and whole industries, and seriously affected commodity prices. The rate of unemployment rose to a high of 30% in 1931-32. Large numbers of families moved from the cities to the country, where they worked as unpaid labourers in return for shelter and the opportunity to grow and catch their own food.

Australian agriculture experienced a severe setback during the Depression, with the price received for commodities falling drastically. From 1932 to 1936 the Government provided assistance to wheat farmers until the price of wheat finally climbed in 1935-36, due to a decline in world production. Australian plantings increased again, and while Australia produced 3-4% of the world's wheat, it accounted for 18% of total world exports, reflecting the high exposure of Australian farmers to international markets.

In spite of the difficulties experienced maintaining trade during both the War and the Depression,

the value of Australian exports increased significantly in the first four decades of this century. Compared with 1913, in 1939-40 the value of agricultural exports increased by 151% for agricultural produce, 88% for pastoral produce, 411% for dairy and farmyard produce, 24% for mines and quarries and 494% for the manufacturing group. Within specific industries, dairy and farmyard produce increased from 5% of total exports in 1913 to 12% in 1939-40, agricultural exports increased from 13% to 16%, but pastoral exports fell from 51% to 47%.

The outbreak of World War II in September 1939 presented a new challenge for the industry, and again had a detrimental effect on Australian agriculture trade. Farmers became isolated from world markets, and heavy restrictions were placed on the use of superphosphates and other supplies. Labour was also seriously affected, and during the war years much of the farm management and labour fell to women, while fathers and husbands were fighting overseas.

The 1940s and 1950s

The governments of both the United Kingdom and Australia designed policies to maintain the agricultural production necessary to feed and clothe service personnel during the War. A number of restrictions were placed on the civilian purchase of goods by rationing commodities like meat, sugar and butter, and other industries were encouraged to expand. This particularly applied to the cotton industry, which until then had been producing about one-third of Australia's cotton requirement. As a wartime measure, the area planted to cotton increased from an average of 15,000 hectares per annum in the ten years to 1929-30, to around 24,300 hectares in the late 1930s and early 1940s. Following the War, the area planted dropped to an average low over the next five years of 4,800 hectares.

Wartime shipping restrictions resulted in considerable disruption to trade. As half of the apple and pear production was exported, the Government financed an Apple and Pear acquisition scheme. At the same time the purchase of dried fruit was commissioned by the United Kingdom Government. Wine, which was not included among the commodities sold by contract to the United Kingdom as a war-time emergency measure, was seriously affected by the loss of export trade, but local consumption increased due to the restricted availability of beer and the presence of large numbers of overseas service personnel based in Australia. To meet both the requirements of the United Kingdom, Australia and the allied services, control of the **Meat Export Control Act 1935-46**, which allowed the export of meat under licence, was taken over by National Security Regulations. In addition, as part of a wartime agreement, the United Kingdom contracted to handle the sale of all Australian wool for the duration of and one year following the War.

During the World War II, the Australian Government acquired all wheat, and distributed net proceeds to growers on a pooling basis. It also provided a subsidy on the purchase of wheat for stock feed, designed to reduce the surplus created by shipping difficulties and to increase the production of eggs and pigs. Despite these efforts, from 1939 the area of wheat planted declined, and continued to fall for every year of the War until the drought of 1944-45, by which time the surplus of unsold wheat had diminished and all available stocks were sold and exported to war-stricken Europe and Asia. The area planted to grain then began to increase, and Australia continued to produce about 3% of the world's wheat and provide between 15% and 20% of total world exports of wheat. By then, however, Canada had developed into a major wheat exporter, providing 60% of net world exports. Growers, wanting to avoid the depressed conditions of the 1930s, saw that if one body could be developed to sell wheat, Australia would have more bargaining power on the international market. In 1948 a national marketing scheme, the Wheat Stabilisation Plan, started with the first plan covering the five year period 1948-49 to 1952-53.

By 1955-56 Australia's wheat production was 5.4 million tonnes, 720,000 tonnes greater than the average for the ten years ending 1938-39. Large storage facilities for wheat were built during the

early 1950s to accommodate this high production. This situation changed quickly when, in 1957-58, drought resulted in a sharp fall in wheat supplies, and a need to import stocks to meet local demand. This was the second time since 1902 that it had become necessary for Australia to import wheat.

Wool sales had also been affected by government intervention during the War. By 1945, as a result of the contract to purchase wool during the War, the United Kingdom had developed a huge stockpile amounting to about two years' consumption. It was estimated that, at the current level of production and consumption, it would take 12-13 years to deplete this stockpile. In an effort to assist this process, and reduce price fluctuations which had plagued the industry in the pre-war years, it was decided to establish a floor price for the sale of wool, and offer for sale both the current year's clip and some selected lines of the stockpile. This was operated by the Joint Organisation involving the United Kingdom, New Zealand, Australia and South Africa. With the return to this regulated auction system, the price of wool rose and continued to do so, resulting in the disposal of a large part of the wool that had been stockpiled over the war years. The Joint Organisation was abolished in 1951. Prosperity in the wool industry peaked in 1950-51 when the average greasy wool price reached 144.19 pence per pound, (equivalent to around $37 per kilogram in today's prices, compared to around $4.50 per kilogram being achieved now), nine times greater than the 1945-46 United Kingdom contract price, and almost thirteen times greater than the average for the ten seasons ending in 1938-39 (10.39 pence per pound). This increase in price has been attributed to the demand for wool generated by the Korean War.

During this period Australia was said to be "riding on the sheep's back". Whereas in 1945-46 the gross value of wool production represented 17% of the total value of production of all agricultural industries, in 1950-51 this rose to 56%. The increase in the price of wool led to a rise in sheep numbers, from 96 million in 1946 to 113 million in 1950. As could be expected, the period of exceptionally high prices did not last, and returns for wool quickly fell away. In 1951-52 they were half the returns of the previous year, and by 1955-56 the price of wool was the lowest since 1948-49. By 1966-67 the gross value of wool production had declined to 21% of the total value of production for agricultural industries.

In real terms, farm incomes rose more slowly than wages, and the movement away from the land continued, resulting in the proportion of total employed males and females who were employed on farms dropping from 19% in 1933 to 14% in 1954 (as for previous years, these values do not include the contribution made to the industry by full blooded Aboriginal people, who contributed significantly to the cattle industry in Queensland and the Northern Territory). While fewer people remained on the land, production increased, largely due to technological progress. The growth of mechanisation in agriculture expanded at a considerable rate following the war, thanks both to improvements in technology and supplies. The number of tractors on rural holdings rose from around 42,000 in 1939 to 202,000 in 1956, almost fourfold, whereas between 1938-39 and 1955-56 the number of rural holdings fell slightly, from 254,000 to 253,000.

In 1945-46 there were 4 million hectares of sown pasture, up considerably on 2.1 million hectares in 1929-30. Along with the productivity increase resulting from improved pastures, the carrying capacity of properties increased considerably from the late 1940s following the introduction of the myxomatosis virus, which drastically reduced the rabbit population.

The 1960s and 1970s

The drought of 1958 lasted until 1968, the most severe since 1903. During this period crops and pastures failed, and sheep and cattle numbers in various areas were reduced. Water storages, particularly in New South Wales, were so reduced that irrigation was restricted. The drought developed in two parts which overlapped in time and area. Central Australia and vast areas of adjacent Queensland, South Australia, Western Australia, New South Wales, and northern

Australia were affected between 1958 and 1966. South-eastern Australia experienced severe drought between 1964 and 1968. While rain in 1966 broke the drought in central Australia and improved the situation in much of South Australia and New South Wales, it was not sufficient and conditions deteriorated again in 1967. Despite the harsh conditions, the economic loss was less severe than would be expected. This has been attributed to the relieved pressure on grazing country resulting from the greatly reduced rabbit numbers and the improved transport systems facilitating the purchase and transport of fodder from less affected areas to the areas of greatest need, and the movement of stock to less affected areas for agistment.

Between 1960 and 1970, prices of the three main commodities, wool, wheat and meat, fluctuated at similar rates. During this period, sheep numbers expanded from 155 million to 180 million and beef cattle numbers from 12 million to 18 million, and the area of wheat sown grew from 4.9 million to 9.5 million hectares, helped by opening up 3 million hectares in Western Australia.

The destination of agricultural products had changed considerably since 1947, when the United Kingdom imported one-third of all Australian exports, including 80% of all beef and 90% of all butter. By the mid 1980s, the United Kingdom was taking less than 2% of Australian rural exports, the major importers being Japan 21%, the Middle East 15%, North America 12%, the European Economic Community (EEC) 11%, Eastern Europe 9%, South East Asia 9% and China 5%.

In the 1960s Japan and the European Common Market had surpassed the United Kingdom as the largest purchasers of Australian wool. Unfavourable conditions in these countries, however, saw the price drop significantly in 1971 to about 50% of its 1964 level. This led to the creation of the Australian Wool Commission, with the role of supporting the sale of Australian wool by setting a floor price and stockpiling any unsold wool. This wool was then resubmitted for sale when wool prices improved. The scheme operated very successfully in the early years of its establishment, and the Commission was able to dispose of all stockpiled wool during the periods of high wool prices in 1974 and 1979.

Since 1958-59 the USA had surpassed the United Kingdom as the principal market for Australian beef exports; by 1966-67 the total value of beef and veal shipped to these two countries was $145m and $29m respectively. World wide demand for beef saw cattle prices increase by 40% between 1969 and 1974, but by 1975 world overproduction and political decisions in the USA and Japan led to the collapse of world prices and the subsequent decline of beef exports from Australia. Prices remained low until 1979, when new markets were established in Eastern Europe and USSR, and new quotas negotiated with the USA.

While wheat prices had been relatively stable since the early sixties, in 1973 demand increased in the USSR and China, resulting in prices almost a doubling, and they remained high until the early 1980s. This led to an expansion in the area sown from 9.4 million hectares in 1970 to 12.9 million hectares in 1984.

In 1966-67 the United Kingdom was still the principal importer of Australian butter, taking 78% of exports; however Japan had become the principal importer of Australian cheese, with 37% of Australian exports. The trade in Australian butter was severely affected when Britain entered the EEC in 1973. Dairy herd numbers, which had totalled 4 million, fell to 2.4 million by 1988. Butter exports dropped from 79,000 tonnes in 1973 to a low of 7,000 tonnes in 1981-82. Thankfully new markets were established in Asia and the Middle East, which provided relief for the industry and boosted trade to over 40,000 tonnes in 1988. However this rationalisation of the industry meant the end of the small dairy farmer in Australia.

The Australian fruit industry was similarly affected by Britain's entry into the EEC. Between 1975 and 1990, Australia's annual apple exports fell from about 86,000 to 27,000 tonnes. Extensive 'tree pull' schemes were instigated to rapidly reduce the level of fruit production, in an attempt to

prevent a glut of product on the market. Since then, new markets have been developed in South East Asia which have proved lucrative, and tree plantings have increased.

As new markets for commodities became identified and established, there was some slow expansion into new agricultural industries. Of 16 million hectares sown in 1966-67, wheat accounted for 53%, oats 11%, green fodder 14%, hay 9%, barley 6%, and sugar cane 1.4%. Sorghum had established itself as more drought and frost resistant than maize and became a popular alternative, accounting for 1.3% of the area sown, followed by maize (0.5%), sunflower (0.2%), and fruit and vegetables 1% each. The balance was sown to rice, cotton, hops, peanuts, tobacco, vineyards and other unspecified crops. Safflower was emerging as a viable crop, the area planted increasing from 2,000 hectares in 1962-63, to 38,000 hectares in 1966-67.

During the 1960s and 1970s, the long term effects of stocking rates and cultivation techniques on land degradation were scientifically documented and publicly debated. The dryland salinity problems of Western Australian wheatlands and the rapidly increasing water tables of the Murray and Murrumbidgee irrigation areas were two regions of particular concern. The identification of a number of land degradation issues relating to poor farming practices led to primary producers analysing the long term effects of individual management practices. Improvements in farming techniques were encouraged, and practices established to halt and, where possible, reverse the damage that had already occurred to much of the area currently farmed in Australia.

The 1980s and 1990s

By the mid 1990s Australian agriculture contributed only around 3% to GDP, down from 15-20% in the early 1950s. The rural sector's contribution to total exports had dropped from around 75% to 28%. Agriculture now accounts for less than 5% of Australia's employment, down significantly from 10% in the 1950s. The old saying that Australia "rides on the sheep's back" has long ceased to describe Australia's economy, or even Australian agriculture. Mining, manufacturing, service industries and construction have outstripped agriculture in relative importance to the economy.

The other notable feature of Australian agriculture at the end of the century is the declining importance of small farm operators. Roughly half the farm establishments contribute less than 20% of commodity output. In many of the major broad acre crops (wheat, barley, grain sorghum, lupins, etc.), the contribution of half the establishments is well under 10%, as it is for the dairy industry. At the start of the century the State Governments were attempting, through closer settlement schemes, to get more population onto the land and to create a small farmer class. At the end of the century, farm economics are resulting in the opposite. The small farms are giving way to larger and more viable economic farm units. In 1996-97, about one-tenth of farm businesses were responsible for almost half of farm business turnover and cash operating surplus.

Over the last 10 years, wool producers have had to face significant changes in the industry, including a decline in the underlying demand for wool, changes to wool marketing arrangements, disruption of traditional international markets, and strong competition from competing fibres, which have had a devastating effect on the profitability of all sectors of the wool industry. In 1989-90, before the wool price collapsed from an average greasy auction price of around 600c/kg to an annual low of 314c/kg in 1992-93, the sheep industry had contributed 20% of all farm business turnover, almost 22% of agricultural value added, and around a fifth of cash operating surplus generated in the agricultural industry. Since the wool price collapse, the industry's contribution to agricultural turnover has fallen to about 6%, value added to 7% and cash operating surplus to 5%. Australian wool production has fallen by 35% since 1990, to around 650,000 tonnes in 1997-98.

In 1996-97, 'grain' and 'grain-sheep/beef' combinations accounted for around 37% of turnover, similar to the proportion at the start of the 1980s. Fluctuations in these industries' contribution and performance are tied to climatic conditions and market forces. In 1994-95 the 'grain industry' accounted for 12% of agricultural business turnover. The previous year it had been 16%, but in 1995-96 it was 20%.

Across all agricultural industries the relative importance of inputs into agriculture have remained stable over the past two decades. Marketing expenses (e.g. commission, packaging, freight and cartage, insurance, handling costs), and wages are the two main operating costs. Marketing expenses have generally been 11-14% of total operating costs. Wages have remained at about 13%, but declined slightly to 11.5% during the mid 1990s. Despite significant price increases, fuel and fertilisers have remained at around 5% and 7% respectively of total farm operating costs.

The most variable input, in terms of relative importance, has been interest paid. In the late 1970s it was about 8% of farm operating costs, rising to about 13% in the late 1980s, a reflection of the overall upward movement of interest rates in the economy, accompanied by increasing farm debt. The 1990s have seen a fall in rates, and in interest costs as a proportion of farm input costs to about 8%.

The adoption of new technology is now more important than ever as farmers try to maintain levels of profitability in the face of rising costs, worsening terms of trade, and restrictions on land use and farming practices imposed by governments as society becomes more aware of the need to develop sustainable farming practices. Satellite technology has been adopted in a number of ways, such as using satellite imagery when making decisions on land use, satellite ground positioning systems to guide spraying and cultivation equipment, and satellite communication technology for controlling equipment in remote areas, such as pumps and generators. PVC piping is used increasingly to pipe water, previously channelled over great distances through open bore drains in the inland areas, as more efficient use of artesian water becomes necessary.

The majority of agricultural commodity production is exported. However, the relative importance of agriculture as an export earner for the country has undergone considerable decline since the 1950s, when it generated 75-80% of the value of Australian merchandise exports. This decline in relative importance reflects the diversification of the Australian commodity export base, particularly in mining and manufacturing.

In addition to changes in the export commodity mix, there have been significant changes in the makeup of agricultural commodities exported. Wool has experienced a decline in demand as well as a fall in price; grain exports, notably wheat and barley, have also had to compete against subsidised production by European Union countries and US agricultural production enhancement programs. The same situation has applied to dairy output (butter, cheese and dried milk products). The citrus fruit industry has also faced considerable competition from large plantations in South America.

There has been considerable diversification in the mix of agricultural commodities exported to the ASEAN (Association of South East Asian Nations) group of countries and to other Asian countries such as China, Korea and Japan. The ASEAN countries have developed as a significant destination for export of apples and dairy products. Between 1990-91 and 1996-97, the trade in live cattle, particularly to the Philippines and Indonesia, expanded enormously, though more recently exports to Indonesia have been affected by the Asian economic crisis. There has also been a limited opening of the Japanese market to Australian rice.

In June 1998 agriculture accounted for 4.4% of the employed population. People employed in agriculture totalled 375,000, of whom 62% were proprietors and partners, and 38% paid employees. These figures understate the relative importance of agriculture in terms of total employment generated by the sector. Services to agriculture (veterinary services, contract

harvesters, rural advisers etc) employ an additional 27,000 people. Food processing establishments, such as abattoirs, wine making establishments, flour millers and fruit processors, also employ significant numbers of people. Similarly, the marketing and transport of agricultural produce generate significant employment which is not attributed to the agriculture industry. However, the importance of agriculture as an employer is far below that of the start of the century, when around 30% of employed males and 10% of employed females worked directly in the agricultural and pastoral industries.

The age structure of persons employed in agriculture is significantly different from that in other industries. According to the 1996 Census of Population and Housing, the median age for all persons employed in agriculture was 44 years, substantially higher than 38 years for all persons employed in all industries. The median age for males employed in agriculture was 43 years; for females it was 46 years. Both were higher than in all industries combined (males 38 years, females 37 years). The upward movement in the median age of farmers reflects fewer young people entering agriculture to take the place of ageing workers. In the early 1950s almost 11% of persons employed in agriculture were under 20; 21% of males and 15% of females employed in agriculture were aged 20 to 29. By the mid 1990s these proportions had fallen to 16% and 11% respectively. At the other end of the age scale, the proportion of males aged 60 and over had gone from 13% at the 1954 census to 17% at the 1996 census, and for females from 14% to 16%.

This article has shown that, while Australian farmers have enjoyed periods of economic boom and prosperity, they have also experienced times of extreme hardship, brought about by an unreliable climate and volatile market forces. Currently, with Australia's high exposure to international markets, and a domestic environment in which farmers are expected to operate without government assistance, many farmers are experiencing financial pressure to restructure their operations. This will require, in many cases, a change in the mix of activities on farms, and even an expansion into new agricultural industries. While innovation, planning and hard work will improve the circumstances of many individual farmers, agriculture is unlikely to again reach the prominent place it held in the Australian economy up to forty years ago.

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16/05/2008 Note: A spelling error in the headline was corrected.

This page last updated 15 May 2008